

2. (former claim 27) A channel as claimed in claim 1 wherein there are means to pass light through the entire channel to permit whole column imaging detection.
3. (former claims 28) A channel as claimed in claim 1 wherein the substrates are transparent and there are means to pass light through the entire channel to permit whole column imaging detection.

Claims 2-15, 17-26 and 29-34 are withdrawn.

Remarks

This amendment is in response to the Office Action mailed May 3, 2004.

In response to the Examiner objections claims 2-15, 17-26 and 29-34 have been withdrawn. Claim 1 has been amended and combined with claim 16 to form new claim 1. Claims 27 and 28, which are dependent claims on the new claim 1, are numbered now as claims 2 and 3. As indicated by the Examiner in the Office Action, the word "prevent" in original claim 28 is incorrect. It was replaced by word "permit" in new claim 3.

Claim 16 has been rejected by examiner under U.S.C. 103(a) as being unpatentable over Soane et al. (US 6,176, 962 B1) in view of Parce et al. (US 6,465,257 B1), over Yon-Hin et al. (US 6,440,645 B1) in view of Parce et al., over Sibbald (GB 2275428 A) in view of Parce et al., over Kennedy (US 6,074,725) in view of Parce et al. and over Kennedy in view of Shiraishi et al. (US 4,699,680) and Ogawa et al. (US 4,769,408). It is respectfully submitted that although previous art cited by the Examiner teaches straight microchannel with parallel walls for use for separating two or more

substances, said channel being made using range of different printing techniques (Soane et al., Yon-Hin et al., Sibbald, Kennedy, Shiraishi et al., and Ogawa et al.) and the use of tapered structure as “channel header” (claim 4, Parce et al.) to deliver equal flow rates in the parallel channels connected to the tapered structure (Parce et al.), it fails to teach use of the tapered channel to perform separation of one or more substances. Claim 16 in combination with claim 1, teaches use of tapered channel to perform separation of one or more substances. It is respectfully submitted that the combination of the teaching by Parce et al. with Soane et al., Yon-Hin et al., Sibbald, Kennedy, Shiraishi et al. and Ogawa et al., will not make the teachings of claim 16 obvious to one with ordinary skill in the art at the time the invention was made, since the purpose and structure of the tapered channel described by Parce et al. and the present application are different. The tapered structure taught by Parce et. al in Figure 4 is not continuous since it has holes in its wall to allow connection to a multiplicity of parallel channels. The tapered structure in Figure 4 (Parce et al.) constitutes “channel header” to deliver equal flow rates in the parallel channels connected to the tapered structure. The tapered channel in Figure 1c in the present invention is defined by continuously impermeable lines 10 to define fluidically continuous tapered channel, which is required to perform separation. In the fluidically continuous tapered channel, it is possible to separate hemoglobins by a process of isoelectric focusing (IEF) without the need for carrier ampholytes as shown in Figure 8, because of the unique property of the tapered channel, resulting in the generation of temperature gradient and corresponding pH gradient. It is not necessary to have openings in the separation channel to introduce a sample as a narrow plug of the sample as shown in Parce et al., Soane et al., Yon-Hin et al., Sibbald, Kennedy, Shiraishi et al., and

Ogawa et al., since the formation of the pH gradient in the channel focuses proteins according to their isoelectric points, as illustrated in Figure 8. It is respectfully submitted that it would not be obvious to produce a fluidically continuous impermeable tapered channel for the purpose of separation of two or more substances based on any combination of teachings by Parce et al. with Soane et al., Yon-Hin et al., Sibbald, Kennedy, Shiraishi et al., and Ogawa et al.

After the amendment of claim 1 the shape of the claimed channel is limited to a tapered structure. In addition the description "impermeable" was added to claim 1 to further describe the feature of the tapered channel walls. The present claims 2 and 3 are dependent on claim 1. Claim 2 and 3 define the property of the tapered channel to permit whole column imaging detection, and it is believed, to be allowable for the reasons argued above with respect to the new claim 1.

In view of the above reasons, it is submitted that claims 1-3 are allowable and applicant respectfully requests an early notice to such effect.

Respectfully submitted,



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